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**Notes:**

1. Untranslatable words are replaced with asterisks (\*\*\*).
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### [Claim(s)]

[Claim 1] The discharge method of the sap-wood which pressurizes sap-wood by the plunger which sticks to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slides on it, and carries out discharge from a nozzle.

[Claim 2] The discharge method of sap-wood of Claim 1 which arranges a plunger in the middle of the space filled with sap-wood.

[Claim 3] Claim 1 or the discharge method of sap-wood of 2 divide in the nozzle side sap-wood part and the storage container side sap-wood part, and said plunger part carries out advance operation of the inside of a liquid transport way, and makes sap-wood of the nozzle side sap-wood part breathe out among the divided liquids by the sliding surfaces of the plunger part which sticks to the inner wall surface of a liquid transport way, and slides on it.

[Claim 4] The discharge method of sap-wood of Claim 3 which it has [ Claim 3 ] the valve system in which a plunger part opens for free passage or intercepts the nozzle side sap-wood part and the storage container side sap-wood part, carries out advance operation of the inside of a liquid transport way for a valve system in the state of stoppage, and makes sap-wood breathe out.

[Claim 5] Claim 3 or the discharge method of sap-wood of 4 of consisting of plunger heads by which the tip of a plunger part has been arranged in a channel, and a plunger head carrying out advance movement in sap-wood, and carrying out discharge of the sap-wood.

[Claim 6] Claim 3, the discharge method of sap-wood of 4 or 5 of consisting of the 1st process which makes the nozzle side sap-wood part a closed region, the 2nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a liquid transport way, and the 3rd process which advances and carries out discharge of the plunger part.

[Claim 7] The 1st process is the discharge method of sap-wood of Claim 6 including the 5th

process which opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage.

[Claim 8] Claim 6 or the discharge method of sap-wood of 7 including the 4th process which removes the air bubbles of sap-wood in a liquid transport way between the 2nd process and said 3rd process.

[Claim 9] The 4th process is the discharge method of sap-wood of Claim 8 which consists of the 6th process which makes the nozzle side sap-wood part a closed region, and opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage, and the 7th process which carries out advance movement of the plunger part.

[Claim 10] Claim 6 or the discharge method of one sap-wood of 9 of making a blockade means a liquid transport way end or the discharge valve arranged in the middle of the liquid transport way.

[Claim 11] A blockade means is the discharge method of sap-wood of Claim 10 which blockades the discharge mouth at the tip of a nozzle.

[Claim 12] The 5th process is the discharge method of sap-wood of Claim 7 by the valve system prepared in the plunger part, or either of 11.

[Claim 13] The liquid transport way which opens for free passage the sap-wood storage part which stores sap-wood, the nozzle part which carries out discharge of the sap-wood, and said storage part and said nozzle part, The plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, [ said plunger part / it comes out with the plunger transportation device which carries out attitude movement, is constituted, and ] Discharge equipment of the sap-wood characterized by having the liquid transport way end of the liquid transport way 2 which opens the sap-wood storage part near the sap-wood storage part of a liquid transport way near the nozzle side end of a liquid transport way for free passage, and said liquid transport way 2, or the liquid transport valve \*\*\*\*(ed) in the middle of liquid transport way 2.

[Claim 14] The liquid transport way which opens for free passage the sap-wood storage part which stores sap-wood, the nozzle part which carries out discharge of the sap-wood, and said storage part and said nozzle part, The plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, The plunger transportation device which carries out attitude movement of said plunger part, and the discharge valve \*\*\*\*(ed) in the middle of the nozzle side end of a liquid transport way, or the liquid transport way, the discharge equipment of the sap-wood characterized by coming out with the liquid transport way 2 which opens the sap-wood storage part near the sap-wood storage part of a discharge valve and a liquid transport way for free passage, being constituted, and said discharge valve taking the second position which opens for free passage the first position which opens a liquid transport way and a nozzle for free passage, and a liquid transport way and the liquid transport

way 2.

[Claim 15] The liquid transport way which opens for free passage the sap-wood storage part which stores sap-wood, the nozzle part which carries out discharge of the sap-wood, and said storage part and said nozzle part, the discharge equipment of the sap-wood characterized by having the valve system intercepted or it comes out with the plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, and is constituted and said plunger part opens said nozzle part and said storage part for free passage.

[Claim 16] Discharge equipment of sap-wood of Claim 15 characterized by having a discharge valve in the middle of said liquid transport way near the nozzle side end of said liquid transport way.

[Claim 17] Claim 15 or 16 liquid discharge equipment which are characterized by the inside diameter of said liquid transport way and the inside diameter of said discharge valve considering it as the diameter of said substantially.

[Claim 18] The plunger rod with which said plunger part has a tubular portion, and said tubular portion has an outer wall side and the hole 1 open for free passage, The plunger head which it is equipped with at the tip of said plunger rod, has the tubular portion of said plunger rod, and the hole 2 open for free passage, and has the seal part stuck to an outer wall with the wall surface in a liquid transport way, The valve rod inserted in the tubular portion of said plunger rod, and the valve rod drive means which makes said valve rod stick or estrange with said plunger head, a valve rod, the valve drive means which carries out attitude operation of the valve rod, Claim 15 characterized by being come out and constituted, or the discharge equipment of one sap-wood of 17.

[Claim 19] The 1st process which closes a discharge valve and opens the valve rod inserted in the tubular portion of a plunger head and a plunger rod, The 2nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a liquid transport way, Discharge equipment of sap-wood of Claim 18 which is made to carry out retreat movement of the plunger part, and carries out discharge of the sap-wood according to the 2nd process which moves sap-wood to the nozzle side sap-wood part from the storage side sap-wood part, the 3rd process which opens a discharge valve and closes a valve rod, and the 4th process which advances a plunger part.

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[Detailed Description of the Invention]

[0001]

[The technical field to which industry belongs] This invention relates to the field which pressurizes sap-wood by the plunger which sticks to the inner wall surface of a liquid transport

way, and slides on it, and carries out discharge from a nozzle. The unnecessary dryness adherence in the liquid transport way inside of sap-wood and unnecessary leakage of sap-wood from a plunger are prevented. Moreover, volume which \*\*\*\* a plunger and pressurizes sap-wood is lessened, and it breathes out with sufficient accuracy, and is related with the discharge method of sap-wood and equipment which abolish loss of sap-wood in the cellular removal work in sap-wood, and use sap-wood efficiently further. Here, discharge is discharge [ sap-wood ] and making it drop and \*\*\*\*.

[0002]

[Description of the Prior Art] As technology of \*\*\*\*(ing) sap-wood, the plunger which performs retreat operation and attitude operation is used. Although the technology of making it stopping rapidly, carrying out the seal of approval of the force of inertia to the sap-wood located ahead of a plunger, and \*\*\*\*(ing) sap-wood according to this force of inertia by making the plunger which carries out rapid advance contacting a valve seat is known In order to make the valve seat of the solid which stops force of inertia required of this technology in order to make sap-wood \*\*\*\*, and the solid plunger which exercises contact, and to obtain movement of a plunger by stopping in an instant There was a problem that damage to a plunger and a valve seat will be intense, and the damaged piece of a member will mix and dissolve at sap-wood.

[0003] Then, by these people's doing high-speed advance of the plunger that the above-mentioned problem should be solved, after making the tip side of the plunger for sap-wood discharge close to sap-wood, and subsequently stopping a plunger drive means rapidly It was made to stop rapidly, without making the plunger which carries out rapid advance contact a valve seat, force of inertia was impressed to the sap-wood located ahead of a plunger, and the technology of \*\*\*\*(ing) sap-wood according to this force of inertia was proposed (application for patent No. 319074 [ 2001 to ]).

[0004]

[Problem to be solved by the invention] Although the desired end has attained invention of the above-mentioned point \*\*, the following problems produced it in the stage of carrying out this invention.

[0005] [ the sap-wood which oozed out little by little from the seal part of the plunger ] if attitude move operation of a plunger is repeated It will dry and adhere on the wall surface in a metering zone, the sliding smooth nature of a plunger will be barred, sap-wood leaks out from about [ that the fixed-quantity nature of discharge is spoiled ], and a seal part, and sap-wood may not no longer be breathed out finally.

[0006] In order that [ moreover, ] sap-wood may follow the course which flows into a measurement pipe through a sap-wood supply valve in said equipment from the storage container which stores sap-wood Sap-wood from a measurement pipe to a sap-wood supply valve will also be pressurized by advance operation of a plunger, unnecessary sap-wood

occupancy space will spread in the discharge system which desires a steep pressure increase, and it becomes the factor which bars a steep pressure increase.

[0007] Furthermore, in said equipment, in order to emit the gas discharged toward the open air from the discharge hole in which cellular omission was prepared by the plunger rod, it is mixed with a cellular group, a liquid may be discharged, and this must be conventionally wiped off by Wes's etc. means.

[0008] For this reason, since sap-wood adhered to a plunger member, equipment became dirty, and the liquid was useless although it was a still slighter quantity. Although it could not do [ this slight quantity or ] vainly, when the influence a fixed quantity of air bubbles have on discharge was taken into consideration, since the expensive liquid in particular was not able to expect a fixed quantity of discharge, even if it made the expensive liquid useless, it could not but discharge air bubbles with the liquid which air bubbles mixed. Moreover, when making it \*\*\*\*, it may not \*\*\*\* for air bubbles.

[0009] Then, this invention solves this problem and it makes to offer discharge, the method of dropping and \*\*\*\*(ing), and equipment with sufficient accuracy into a technical problem. Moreover, let it be a technical problem to offer the discharge method of a liquid which does not make useless the sap-wood which discharges effectively the air bubbles mixed in sap-wood, is further mixed with a cellular group at the time of cellular removal work, and is discharged at all, but makes use possible at discharge, dropping, and \*\*\*\*, and equipment.

[0010]

[Means for solving problem] This invention makes the summary the discharge method of the sap-wood which pressurizes sap-wood by the plunger which sticks to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slides on it, and carries out discharge from a nozzle.

[0011] It is the discharge method of the sap-wood which is arranging the plunger in the middle of the space filled with sap-wood, pressurizes sap-wood by the plunger which sticks to the inner wall surface of the liquid transport way which opens for free passage the nozzle arranged in the middle of and a storage part in that case, and slides, and carries out discharge from a nozzle. [ the space where this invention is filled with sap-wood ]

[0012] [ with the sliding surfaces of the plunger part which sticks to the inner wall surface of a liquid transport way, and slides on it ] The inside of the liquid which divided in the nozzle side sap-wood part and the storage container side sap-wood part, and was divided, Said plunger part carries out advance operation, is making the inside of a liquid transport way breathe out, and sap-wood of the nozzle side sap-wood part in that case [ this invention ] [ with the sliding surfaces of the plunger part arranged in the middle of the space preferably filled with sap-wood which stick to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slide on it ] It is the discharge method of the sap-wood

characterized by dividing in the nozzle side sap-wood part and the storage container side sap-wood part, and for said plunger part carrying out advance operation of the inside of a liquid transport way, and making sap-wood of the nozzle side sap-wood part breathe out among the divided liquids.

[0013] A plunger part opens the nozzle side sap-wood part and the storage container side sap-wood part for free passage. Or have the valve system to intercept, carry out advance operation of the inside of a liquid transport way for a valve system in the state of stoppage, are making sap-wood breathe out, and in that case [ this invention ] [ with the sliding surfaces of the plunger part arranged in the middle of the space preferably filled with sap-wood which stick to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slide on it ] The inside of the liquid which divided in the nozzle side sap-wood part and the storage container side sap-wood part, and was divided, It is the discharge method of the sap-wood characterized by for the plunger part equipped with the valve system which intercepts sap-wood of the nozzle side sap-wood part or it opens the nozzle side sap-wood part and the storage container side sap-wood part for free passage carrying out advance operation of the inside of a liquid transport way in the state of stoppage, and making a valve system breathe out.

[0014] The tip of a plunger part consists of plunger heads arranged in a channel, and a plunger head carries out advance movement in sap-wood, is breathing out sap-wood, and in that case [ this invention ] [ with the sliding surfaces of the plunger part arranged in the middle of the space preferably filled with sap-wood which stick to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slide on it ] The inside of the liquid which divided in the nozzle side sap-wood part and the storage container side sap-wood part, and was divided, It is the discharge method of the sap-wood characterized by for the plunger part which consists of plunger heads by which the tip has been arranged in a channel in sap-wood of the nozzle side sap-wood part carrying out advance movement, and making the plunger head breathe out in sap-wood.

[0015] The 1st process made into a closed region by a blockade means which makes the nozzle side sap-wood part a closed region, and which this better \*\* makes a closed region by the liquid transport way end or the discharge valve arranged in the middle of the liquid transport way to blockade the discharge mouth at the tip of a nozzle more preferably, Carry out retreat operation of the plunger part, consist of the 2nd process which supplies a liquid from a sap-wood storage part in a liquid transport way, and the 3rd process which advances and carries out discharge of the plunger part, and in that case [ this invention ] [ with the sliding surfaces of the plunger part arranged in the middle of the space preferably filled with sap-wood which stick to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slide on it ] The inside of the liquid which divided in the

nozzle side sap-wood part and the storage container side sap-wood part, and was divided, It is the way said plunger part carries out advance operation of the inside of a liquid transport way, and makes sap-wood of the nozzle side sap-wood part breathe out. The 1st process made into a closed region by a blockade means which makes the nozzle side sap-wood part a closed region, and which this better \*\* makes a closed region by the liquid transport way end or the discharge valve arranged in the middle of the liquid transport way to blockade the discharge mouth at the tip of a nozzle more preferably, The 2nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a liquid transport way, It is the discharge method of the sap-wood characterized by consisting of the 3rd process which advances and carries out discharge of the plunger part.

[0016] The 1st process includes the 5th process which opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage, and preferably [ the 5th process ] It is based on the valve system prepared in the plunger part, and if needed between the 2nd process and said 3rd process Include the 4th process which removes the air bubbles of sap-wood in a liquid transport way, and in that case [ this invention ] [ with the sliding surfaces of the plunger part arranged in the middle of the space preferably filled with sap-wood which stick to the inner wall surface of the liquid transport way which opens a nozzle and a storage part for free passage, and slide on it ] The inside of the liquid which divided in the nozzle side sap-wood part and the storage container side sap-wood part, and was divided, It is the way said plunger part carries out advance operation of the inside of a liquid transport way, and makes sap-wood of the nozzle side sap-wood part breathe out. Include the 5th process by the valve system preferably prepared in the plunger part including the 5th process which opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage. The 1st process made into a closed region by a blockade means which makes the nozzle side sap-wood part a closed region, and which this better \*\* makes a closed region by the liquid transport way end or the discharge valve arranged in the middle of the liquid transport way to blockade the discharge mouth at the tip of a nozzle more preferably, The 2nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a liquid transport way, It is the discharge method of the sap-wood characterized by including the 4th process which consists of the 3rd process which advances and carries out discharge of the plunger part, and removes the air bubbles of sap-wood in a liquid transport way between the 2nd process and said 3rd process if needed.

[0017] The 6th process which the 4th process makes the nozzle side sap-wood part a closed region, and opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage, Consist of the 7th process which carries out advance movement, and a plunger part in that case [ this invention ] [ with the sliding surfaces of the plunger part arranged in the middle of the space preferably filled with sap-wood which stick to the inner wall surface of the

liquid transport way which opens a nozzle and a storage part for free passage, and slide on it ] The inside of the liquid which divided in the nozzle side sap-wood part and the storage container side sap-wood part, and was divided, It is the way said plunger part carries out advance operation of the inside of a liquid transport way, and makes sap-wood of the nozzle side sap-wood part breathe out. Include the 5th process by the valve system preferably prepared in the plunger part including the 5th process which opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage. The 1st process made into a closed region by a blockade means which makes the nozzle side sap-wood part a closed region, and which this better \*\* makes a closed region by the liquid transport way end or the discharge valve arranged in the middle of the liquid transport way to blockade the discharge mouth at the tip of a nozzle more preferably, Carry out retreat operation of the plunger part, consist of the 2nd process which supplies a liquid from a sap-wood storage part in a liquid transport way, and the 3rd process which advances and carries out discharge of the plunger part, and if needed between the 2nd process and said 3rd process It is the discharge method of the sap-wood characterized by consisting of the 6th process which this 4th process makes the nozzle side sap-wood part a closed region including the 4th process which removes the air bubbles of sap-wood in a liquid transport way, and opens the nozzle side sap-wood part and the storage part side sap-wood part for free passage, and the 7th process which carries out advance movement of the plunger part.

[0018] Moreover, the sap-wood storage part in which this invention stores sap-wood and the nozzle part which carries out discharge of the sap-wood, The liquid transport way which opens said storage part and said nozzle part for free passage, and the plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, [ said plunger part / it comes out with the plunger transportation device which carries out attitude movement, is constituted, and ] The discharge equipment of the sap-wood characterized by having the liquid transport way end of the liquid transport way 2 which opens the sap-wood storage part near the sap-wood storage part of a liquid transport way near the nozzle side end of a liquid transport way for free passage, and said liquid transport way 2, or the liquid transport valve \*\*\*\* (ed) in the middle of liquid transport way 2 is made into the summary.

[0019] Moreover, the sap-wood storage part in which this invention stores sap-wood and the nozzle part which carries out discharge of the sap-wood, The liquid transport way which opens said storage part and said nozzle part for free passage, and the plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, The plunger transportation device which carries out attitude movement of said plunger part, and the discharge valve \*\*\*\*(ed) in the middle of the nozzle side end of a liquid transport way, or the liquid transport way, it comes out with the liquid transport way 2 which opens the sap-wood storage part near the sap-wood storage part of a discharge valve and a liquid transport way for



free passage, and is constituted, and the discharge equipment of the sap-wood characterized by said discharge valve taking the second position which opens for free passage the first position which opens a liquid transport way and a nozzle for free passage, and a liquid transport way and the liquid transport way 2 is made into the summary.

[0020] Furthermore, the sap-wood storage part in which this invention stores sap-wood again and the nozzle part which carries out discharge of the sap-wood, [ it comes out with the liquid transport way which opens said storage part and said nozzle part for free passage, and the plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, is constituted, and / said plunger part ] It has the valve system intercepted or it opens said nozzle part and said storage part for free passage, The discharge equipment of the sap-wood preferably characterized by to have a discharge valve in the middle of said liquid transport way near the nozzle side end of said liquid transport way and the inside diameter of said liquid transport way and the inside diameter of said discharge valve considering it as the diameter of said substantially if needed is made into the summary.

[0021] The discharge equipment of the above-mentioned sap-wood of this invention more specifically [ said plunger part ] The plunger rod with which it has a tubular portion and said tubular portion has an outer wall side and the hole 1 open for free passage, The plunger head which it is equipped with at the tip of said plunger rod, has the tubular portion of said plunger rod, and the hole 2 open for free passage, and has the seal part stuck to an outer wall with the wall surface in a liquid transport way, it carries out being come out and constituted to the valve rod inserted in the tubular portion of said plunger rod, the valve rod drive means which makes said valve rod stick or estrange with said plunger head, a valve rod, and the valve drive means which carries out attitude operation of the valve rod with the feature. In that case, the 1st process which the discharge equipment of this sap-wood closes a discharge valve, and opens the valve rod inserted in the tubular portion of a plunger head and a plunger rod, The 2nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a liquid transport way, Retreat movement of the plunger part is carried out, and discharge of the sap-wood is carried out according to the 2nd process which moves sap-wood to the nozzle side sap-wood part from the storage side sap-wood part, the 3rd process which opens a discharge valve and closes a valve rod, and the 4th process which advances a plunger part.

[0022]

[Mode for carrying out the invention] Advance operation of the inside of said plunger part liquid transport way is carried out, and sap-wood of the nozzle side sap-wood part is made to breathe out among the sap-wood divided by the nozzle side sap-wood part and the storage container side sap-wood part by the sliding surfaces of the plunger part which sticks to the inner wall surface of the liquid transport way which a nozzle and a sap-wood storage part open

for free passage, and slides on it. Here, since the amount of discharge of sap-wood is prescribed by the advance movement magnitude of a plunger part and the sliding surfaces of a plunger part are arranged in a channel in a plunger liquid transport way, a plunger part tip is always contacted to sap-wood.

[0023] Said plunger part preferably equipped with the valve system which opens for free passage or intercepts said nozzle side sap-wood part and said storage container side sap-wood part carries out advance operation of the inside of a liquid transport way for said valve system in the state of stoppage, and makes sap-wood breathe out. Since the plunger part is equipped with the valve system, channel branching is made unnecessary for sap-wood supply. At the time of discharge, pressurization for carrying out discharge of the sap-wood is not barred in particular by closing said valve system and making it march out.

[0024] Moreover, the tip of said plunger part consists of plunger heads arranged in the channel preferably, and said plunger head carries out advance movement in sap-wood. Since a plunger is arranged into a channel, the plunger head at the tip of a plunger part which pressurizes soon the sap-wood which carries out discharge is always located in sap-wood, and the peripheral face of said plunger head contacts sap-wood.

[0025] In the discharge method of the sap-wood which carries out advance movement and which a plunger part sticks a discharge process to the inner wall surface of a liquid transport way here, and carries out discharge By a blockade means, it resembles the 1st process which makes the nozzle side sap-wood part a closed region, the 2nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a liquid transport way, and the 3rd process which advances and carries out discharge of the plunger part, and is carried out more. Said 1st process includes preferably the 5th process which opens said nozzle side sap-wood part and the storage container side sap-wood part for free passage.

[0026] More preferably the air bubbles of sap-wood in a liquid transport way between said 2nd process and said 3rd process including the 4th process to remove still more preferably the 6th process which said 4th process makes a closed region said nozzle side sap-wood part by said blockade means, and opens said nozzle side sap-wood part and the storage part side sap-wood part for free passage, the 7th process which carries out advance movement of the plunger part, \*\* and others -- \*\*

[0027] As for said blockade means, it is desirable to consider it as a liquid transport way end or the discharge valve arranged in the middle of the liquid transport way. By making said discharge valve into a closed position, it can be considered as a blockade field, and said blockade means may blockade the discharge mouth at the tip of a nozzle. Specifically, it can blockade by the means of a cap etc. to a discharge mouth. Here, said 5th process has the desirable thing to depend on the valve system prepared in the plunger part and which is

performed.

[0028] In the valve system prepared in said plunger part The 21st process which closes a discharge valve and which reaches and opens a valve rod ([ process / which reaches and opens plunger valve system / which makes nozzle side sap-wood part closed space / 21st ]), The 22nd process which is made to carry out retreat operation of the plunger part, and supplies a liquid from a sap-wood storage part in a metering zone, It is desirable to carry out retreat movement of the plunger part, and to carry out discharge of the sap-wood according to the 23rd process which moves sap-wood to the nozzle side sap-wood part from the storage side sap-wood part, the 24th process which opens a discharge valve and closes a valve rod, and the 25th process which advances a plunger part.

[0029] The liquid transport way which opens for free passage the sap-wood storage part which stores sap-wood, the nozzle part which carries out discharge of the sap-wood, said storage part, and said nozzle, The plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, it comes out with the plunger transportation device which carries out attitude movement of said plunger part, is constituted, and has the liquid transport way 2 which opens the sap-wood storage part near the sap-wood storage part of a liquid transport way near the nozzle side end of a liquid transport way for free passage, and the liquid transport way end of said liquid transport way 2 or the liquid transport valve \*\*\*\*(ed) in the middle of liquid transport way 2.

[0030] Unlike the conventional technology in which only a plunger pressurization side \*\*\*\*, a plunger part is \*\*\*\*(ed) by the sap-wood channel and is always \*\*\*\*(ed) by sap-wood. And since the wall surface in a liquid transport way on which a plunger slides is also always \*\*\*\*(ed), sap-wood does not dry and adhere in the plunger surface and the wall surface in a liquid transport way. Moreover, sap-wood leaks out unnecessarily from a plunger, and, originally adhesion of sap-wood to the part which is not desirable does not take place theoretically on an equipment configuration.

[0031] A liquid transport way is prepared between the sap-wood storage part in which sap-wood is stored, the nozzle which carries out discharge of the sap-wood, and \*\*, sap-wood is pressurized by the plunger which sticks to the inner wall surface of said liquid transport way, and slides on it, and discharge is carried out from a nozzle.

[0032] In order to supply sap-wood to a liquid transport way from a sap-wood storage part, it is necessary to seal the nozzle side sap-wood part located in the nozzle side among the sap-wood divided by a plunger. Even if the discharge valve is required for eye others and a discharge valve is not used for it, for example, it may cap at the tip of a nozzle and it may be made to seal it.

[0033] Moreover, the sap-wood storage part which stores sap-wood if it is in invention of discharge equipment and the nozzle part which carries out discharge of the sap-wood, The

liquid transport way which opens said storage part and said nozzle part for free passage, and the plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, The liquid transport way end of the liquid transport way 2 which comes out, is constituted and opens the sap-wood storage part near the sap-wood storage part of a liquid transport way near the nozzle side end of a liquid transport way for free passage further, and said liquid transport way 2, or the liquid transport valve \*\*\*\*(ed) in the middle of liquid transport way 2, It is characterized by preparation \*\*\*\*\* , and the sap-wood divided by the sliding surfaces of the plunger part which sticks to a liquid transport way inside and slides on it is opened for free passage through a valve, and sap-wood supply on the liquid transport way 1 is enabled.

[0034]

[Function] The sap-wood storage part in which this invention stores sap-wood, and the nozzle part which carries out discharge of the sap-wood, The liquid transport way which opens said storage part and said nozzle for free passage, and the plunger part which has the seal part which sticks to the inside of said liquid transport way, and slides on it, it comes out with the plunger transportation device which carries out attitude movement of said plunger part, is constituted, and has the liquid transport way 2 which opens the sap-wood storage part near the sap-wood storage part of a liquid transport way near the nozzle side end of a liquid transport way for free passage, and the liquid transport way end of said liquid transport way 2 or the liquid transport valve \*\*\*\*(ed) in the middle of liquid transport way 2. Unlike the conventional technology in which only a plunger pressurization side \*\*\*\*, a plunger part is \*\*\*\* (ed) by the sap-wood channel and is always \*\*\*\*(ed) by sap-wood. And since the wall surface in a liquid transport way on which a plunger slides is also always \*\*\*\*(ed), sap-wood does not dry and adhere in the plunger surface and the wall surface in a liquid transport way. moreover, sap-wood from a plunger is unnecessary -- it leaks out and, originally adhesion of sap-wood to the part which is not desirable does not take place theoretically on an equipment configuration.

[0035] A liquid transport way is prepared between the sap-wood storage part in which sap-wood is stored, the nozzle which carries out discharge of the sap-wood, and \*\*, and this invention pressurizes sap-wood by the plunger which sticks to the inner wall surface of said liquid transport way, and slides on it, and carries out discharge from a nozzle. In order to supply sap-wood to a liquid transport way from a sap-wood storage part, it is necessary to seal the nozzle side sap-wood part located in the nozzle side among the sap-wood divided by a plunger. Even if the discharge valve is required for eye others and a discharge valve is not used for it, for example, it may cap at the tip of a nozzle and it may be made to seal it.

[0036] If the plunger which carries out rapid advance is stopped rapidly and big force of inertia is given to sap-wood, \*\*\*\*\* will be controlled by movement speed, migration length, etc. of a

plunger, and \*\*\*\* discharge of the sap-wood of the nozzle side sap-wood part will be carried out to a very small quantity. Moreover, when a plunger carries out advance operation quickly and stops advance operation quickly, force of inertia is given to sap-wood of the nozzle side sap-wood part, and discharge of the drop is carried out from a nozzle tip. This discharge operation repeats two or more rapid advance and rapid stops, and carries out discharge of the sap-wood of the nozzle side sap-wood part divided by one advance operation. In addition, it is also possible by adjusting the movement speed and migration length of a plunger to \*\*\*\* at once sap-wood of the nozzle side sap-wood part divided by one advance operation.

[0037] therefore -- in order to make sap-wood \*\*\*\* -- the acceleration of a plunger -- that is, A velocity differential is important, needs to move a plunger at high speed beforehand, and needs to carry out a quick stop after that. In order for a plunger to raise speed to a speed required in order to be controlled by the plunger drive means and to make sap-wood \*\*\*\*, acceleration migration length for a plunger to accelerate is needed.

[0038] Moreover, since the amount of \*\*\*\* discharge is dependent on the migration length of a plunger Since the speed of a plunger needed for \*\*\*\* cannot be obtained if the migration length of a plunger is short The many origin of a liquid transport way and a plunger is determined so that migration length sufficient in order that a plunger may obtain said speed may be acquired from the relation between the amount of \*\*\*\* discharge, and the movement speed of the suitable plunger for the sap-wood made to \*\*\*\*.

[0039] furthermore, in order to want to make the working range (migration length) of a plunger small in order to micrify \*\*\*\*\*, but to obtain the speed of the plunger for making it \*\*\*\* In order to fulfill simultaneously the opposite phenomenon of wanting to enlarge the working range (migration length) of a plunger By making a liquid transport way thin, securing the plunger movement magnitude from which the plunger speed for making it \*\*\*\* is obtained, and making a liquid transport way thin, even if a plunger moves greatly, let the amount of move volume, i.e., \*\*\*\*\*, be slight quantity.

[0040]

[Working example] Hereafter, although the work example of the invention in this application explains based on Drawings, the invention in this application is not limited at all by these work examples. In addition, the same mark is attached and explained to the same member in work examples 1-3.

[0041] The sap-wood storage part 1 in which the work example of work-example 1 this invention stores sap-wood as shown in drawing 1 , The liquid transport way 2 which opens for free passage the nozzle part 3 which carries out discharge of the sap-wood, and said storage part and said nozzle part 3, The plunger part 4 which has the seal part which sticks to the inside of said liquid transport way 2, and slides on it, It consists of a liquid transport way 6 which opens for free passage the plunger transportation device 5 which carries out attitude

movement of said plunger part 4, and the sap-wood storage part 1 and the neighborhood of the nozzle side end of the liquid transport way 2, a liquid transport valve 7 arranged in the middle of said liquid transport way 6, and a frame 9 which supports these each part.

[0042] The frame 9 consists of an up frame which supports the guidance rod which guides a plunger base material in the up-and-down direction, and the screw axis made to move a plunger base material in the up-and-down direction, and a support frame which supports the liquid container which constitutes the sap-wood storage part 1.

[0043] The sap-wood storage part 1 is the container formed at the cylindrical subject part which the upper part opened wide, and the form dished bottom, the liquid transport way terminal area is carrying out the opening to the bottom, and the liquid transport way 2 which coincided said container and the axis is connected in the axis. Therefore, a storage container will surround the liquid transport way 2, and a part of plunger part 4 is immersed in sap-wood in the container of the storage part 1 at the time of an operation. The liquid transport way 2 constitutes the sap-wood discharge pump from a plunger equipped with the seal part which the nozzle is equipped with the shape of a cylinder in the nothing lower end, and is stuck to the inner skin of the liquid transport way 2.

[0044] [ moreover, the sap-wood which it connects with halfway through the liquid transport valve 7, and sap-wood in the sap-wood storage part 1 was supplied to the sap-wood storage part 1 and the liquid transport way 2 by the liquid transport way 2 through the liquid transport valve 7, and was supplied to the liquid transport way 2 ] The seal of approval of the force of inertia is carried out by rapid advance and a rapid stop of a plunger, and it becomes a drop, and is breathed out from a nozzle.

[0045] Drawing 2 is shown and other work examples of this invention [ the discharge equipment of sap-wood of this work example ] The liquid transport way 2 which opens for free passage the sap-wood storage part 1 which stores sap-wood, the nozzle part 3 which carries out discharge of the sap-wood, and said storage part and said nozzle part 3, The plunger part 4 which has the seal part which sticks to the inside of said liquid transport way 2, and slides on it, The plunger transportation device 5 which carries out attitude movement of said plunger part 4, and the discharge valve 8 \*\*\*\*(ed) in the middle of nozzle side end [ of the liquid transport way 2 ], or liquid transport way 2, Consist of a liquid transport way 6 which opens about one sap-wood storage part or the sap-wood storage part 1 of the discharge valve 8 and the liquid transport way 2 for free passage, and a frame 9 which supports these each part, and [ said discharge valve 8 ] It is constituted in order to take the second position which opens for free passage the first position which opens the liquid transport way 2 and a nozzle for free passage, and the liquid transport way 2 and the liquid transport way 6.

[0046] Drawing 3 is shown further and other work examples of this invention [ the discharge equipment of sap-wood of this work example ] The liquid transport way 2 which opens for free

passage the sap-wood storage part 1 which stores sap-wood, the nozzle part 3 which carries out discharge of the sap-wood, and said storage part and said nozzle part 3, The plunger part 4 which has the seal part which sticks to the inside of said liquid transport way 2, and slides on it, Consist of a plunger transportation device 5 which carries out attitude movement of said plunger part 4, and a frame 9 which supports these each part, and [ said plunger part 4 ] It has the discharge valve 8 which has the channel of the inside diameter of the liquid transport way 2, and the diameter of said for the valve system intercepted or it opens said nozzle part 3 and said storage part for free passage near the nozzle side end of said liquid transport way 2 again.

[0047] Moreover, the cellular omission mechanism shown in drawing 4 is prepared in the plunger part 4 in this work example. The plunger rod 11 with which said plunger part 4 has a tubular portion, and said tubular portion has an outer wall side and the hole 13 to open for free passage, The plunger head 12 which it is equipped with at the tip of said plunger rod 11, has the tubular portion of said plunger rod 11, and the cellular omission hole 14 open for free passage, and has the seal part 13 stuck to an outer wall with the inner wall surface of the total liquid transport way 2, The valve rod 16 inserted in the tubular portion of said plunger rod 11, It has the cellular omission mechanism which consisted of [ hole / 14 / of said plunger head 12 / cellular / omission ] air cylinders 17 as a valve rod drive means made to open or close in said valve rod 16. When said air cylinder 17 is operated and a valve rod 16 is retreated, [ said valve rod 16 ] Move in the length direction of the plunger rod 11, and the tip part of a valve rod 16 opens wide the cellular omission hole 14 which separated from the plunger head 12 and was prepared in the plunger head 12. It is open for free passage with the external world through the opening between this cellular omission hole 14, the plunger rod 11, and a valve rod 16, advance movement of the plunger part 4 is carried out, and air bubbles are discharged to the exterior ahead of the plunger head 12.

[0048] in addition -- the above-mentioned cellular omission mechanism is applicable also to a work example 1 and a work example 2 -- moreover, movement of a valve rod -- \*\*\*\*\* -- it is also possible to use a screw like.

[0049]

[Effect of the Invention] Thus, since the liquid transport way inside the sliding surfaces of a plunger and said plunger \*\*\*\* touches sap-wood according to the invention concerned, Since the liquid transport way inside the sliding surfaces of said plunger and said plunger \*\*\*\* does not dry and adhere, the increase in the unnecessary sliding resistance in plunger movement resulting from these can be prevented effectively, and, as for accuracy, discharge, dropping, and \*\*\*\* can improve sap-wood.

[0050] moreover -- it becomes possible, since the equipment configuration which makes unnecessary piping branching for sap-wood supply on the liquid transport way pressurized is

also possible to pressurize necessary minimum sap-wood efficiently -- therefore, sap-wood -- accuracy -- good -- discharge -- it can drop and \*\*\*\*.

[0051] In the work which removes the air bubbles mixed in sap-wood, since the sap-wood which is mixed with a cellular group and discharged is made recyclable, removing air bubbles effectively, it is possible not to make useless the sap-wood discharged at the time of cellular removal at all, but to use it effective in discharge, dropping, and \*\*\*\*.

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[Brief Description of the Drawings]

[Drawing 1] It is the key map showing one work example of this invention, and (a) is a front view and (b) is a side view.

[Drawing 2] It is the key map showing other work examples, and (a) is a front view and (b) is a side view.

[Drawing 3] Furthermore, it is the key map showing other work examples, and (a) is a front view and (b) is a side view.

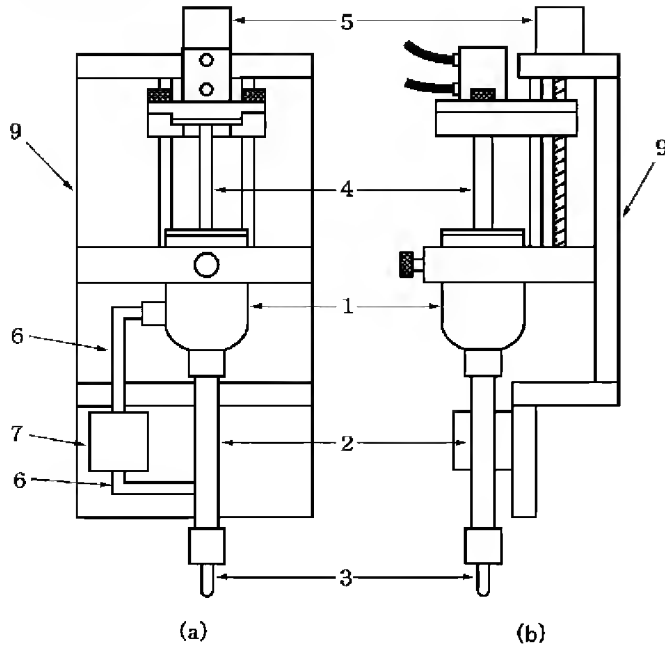
[Drawing 4] It is the important section sectional view of the work example shown in drawing 3 .

[Explanations of letters or numerals]

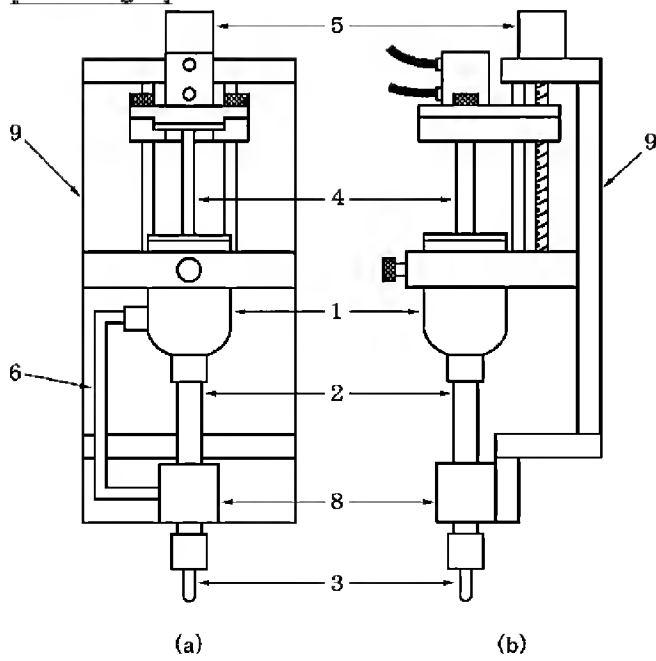
- 1 Sap-wood Storage Part
  - 2 Liquid Transport Way
  - 3 Nozzle Part
  - 4 Plunger Part
  - 5 Plunger Transportation Device (Motor)
  - 6 Liquid Transport Way
  - 7 Liquid Transport Valve
  - 8 Discharge Valve
  - 9 Frame
  - 10 Storage Container
  - 11 Plunger Rod
  - 12 Plunger Head
  - 13 Seal Part
  - 14 Cellular Omission Hole
  - 15 Hole
  - 16 Valve Rod
  - 17 Valve Rod Drive Means (Air Cylinder)
-



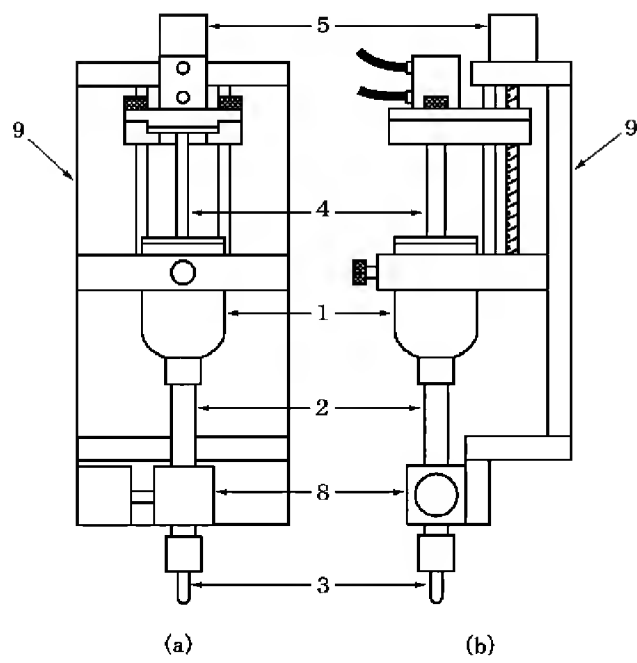
[Drawing 1]



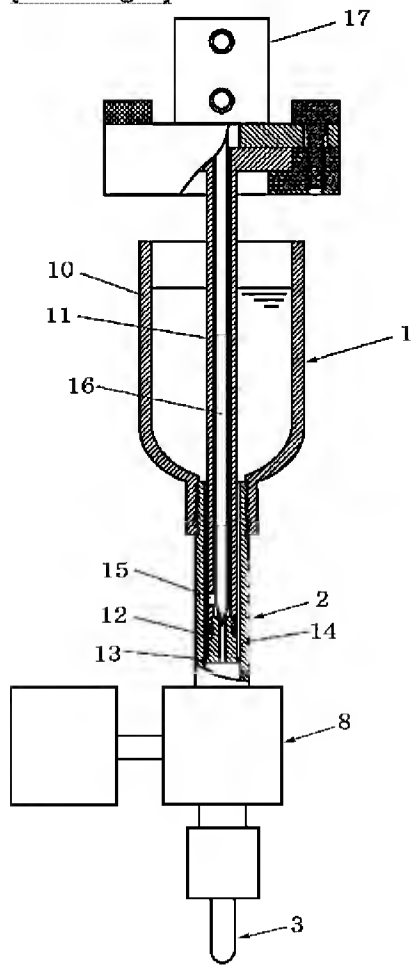
[Drawing 2]



[Drawing 3]



[Drawing 4]



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[Translation done.]